

Claims

1. Lifting device (1) to be mounted in a motor vehicle and intended, in case
the vehicle is involved in an accident, to be activated so as to put a lifting
element (5) being spring-tensioned in the lifting device in motion, wherein
the lifting device comprises:
 - a locking device (7) intended to cooperate with the lifting element (5) for
locking it in a spring-tensioned position, and
 - a release mechanism (9) comprising a striking element (37) intended to
release the locked lifting element (5) by means of striking-pin action so it
can be put in motion under the influence of the spring tension;**characterised** in that the locking device (7) comprises:
 - a plurality of spherical elements (33a-b), and
 - an operating element (27) being movable in the lifting direction of the
lifting element (5),
wherein the striking element (37) is situated at a distance from the operat-
ing element (27) and intended to strike the operating element (27) from be-
low for moving it from a first position, in which it cooperates with the
spherical elements (33a-b) so as to lock the lifting element (5) in the lifting
direction, to a second position, situated above the first position and in
which the locking action ceases.
2. Lifting device according to claim 1, comprising a housing (3) extended in
the lifting direction, in which housing the lifting element (5), the locking
device (7) and the release mechanism are arranged, wherein the operating
element (27) when situated in the first position, the spherical elements
(33a-b) are held in a radial outer position with respect to the lifting direc-
tion, and in which they are engaged with the housing (3) for locking the
lifting element (5) with respect to the housing (3), and when situated in the
second position, the spherical elements (33a-b) have moved to a radial in-

ner position, in which they no longer are engaged with the housing.

3. Lifting device according to claim 2, wherein the housing (3) comprises on the inside of the housing a circumferentially extended cavity (35) for receiving the spherical elements (33a-b) when they are held in the radial outer position.
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4. Lifting device according to any of claim 2-3, wherein the locking device (7) comprises radially extended ducts (31) in which the spherical elements are movably arranged.
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5. Lifting device according to claim 4, wherein each in the radial direction extended duct (31) comprises a plurality of successively arranged spherical elements (33a-b).
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6. Lifting device according to any of claims 2-5, wherein the locking device (7) forms part of the spring-tensioned lifting element (5), and the spherical elements (33a-b) are arranged in the locking device (7) in such a way that that said spring tension forces the spherical elements, from the radial outer position to the radial inner position when the operating element (27) has reached the second position.
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7. Lifting device according to any of claim 2-6, wherein the operating element (27) comprises an upper substantially cylindrical portion (27a) and a lower cylindrical portion (27c), the upper portion having a larger diameter than the lower portion, wherein the upper portion is intended to be in contact with the spherical elements (33b) when the operating element is situated in the first position so as to hold the spherical elements in the radial outer position.
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8. Lifting device according to any of claim 1-7, wherein the operating element (27) is resiliently arranged by means of a compression spring (29) in the locking device in such a way that the spring is tensioned when the operating element (27) is moved from the first position to the second position.

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9. Lifting device according to claim 8, wherein the spring constant of the compression spring (29) is chosen so that the spherical elements (33a-b) will be put in motion towards the outer position, when the operating element (27) is moved from the second position to the first position in situations when the lifting element (5) is pushed in the opposite direction as the lifting direction and the spherical elements reach the radial outer position.

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10. Lifting device according to claim 9, wherein the upper portion (27a) is inclined with an angle (β) of 1-10°, slightly outwards seen in the lifting direction.

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11. Lifting device according to any of claims 2-10, wherein the housing (3) forms a pressure tight space (15) in which an overpressure can prevail and where the lifting element (5) is intended to function as a piston in a gas spring.

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12. Lifting device according to claim 11, wherein the striking element (37) at rest is located at a distance from the underside of the operating element (27).

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13. Lifting device according to claim 12, wherein the distance is within the interval 1-10 mm.

14. Lifting device according to any of the previous claims, wherein the striking element forms part of a low-resistant pushing solenoid.

5 15. Lifting device according to any of claim 3-14, wherein the angle (α) between the tangent, in the point where the spherical elements (33a) are in contact with the cavity (35) when the operating element (27) is situated in the first position, and the horizontal plane lies within the interval 20-40°.